

Brief History of Medical and Veterinary Entomology in the USDA

Claude H. Schmidt and John A. Fluno¹

*North Central Region, Agricultural Research Service, USDA,
Fargo, North Dakota 58102.*

ABSTRACT

A chronological list of developments in medical and veterinary entomology in the last 120 years includes some of the many contributions made by U. S. Department of Agriculture entomologists and chemists that were associated with the Insects Affecting Man and Animals Research Branch.

This chronology had its genesis in 1969 when the junior author, then Assistant to the Chief of Insects Affecting Man and Animals Research Branch, visited several of the larger field laboratories. He found, to his dismay, that many of the newer employees did not have background information on what scientists in the Branch had accomplished, and he was asked numerous questions. To remedy this situation, we prepared a rough draft of some of the highlights which we thought would be interesting and informative. The manuscript was never completed because of more pressing matters. The next thing we knew the junior author was retiring and the Agricultural Research Service (ARS) was being reorganized. So it was high time to resurrect the old draft and bring it up to date.

Perhaps a few words about ARS and its past and present organization will help

the reader put things in perspective. From 1953 to 1972, ARS organized and managed its research program through various Divisions and Branches. During this 19-year period, ARS grew from less than 4,000 to over 10,000 employees. It is therefore not surprising that such a tremendous growth resulted in a need to restructure the organization of ARS. Thus, as of July 1972, ARS underwent a reorganization—or more to the point, a regionalization. Divisions and Branches within ARS were replaced by Regional and Area Headquarters. For example, the senior author served for 5 years as the Chief of the Insects Affecting Man and Animals Research Branch of the Entomology Research Division and is now Area Director for ARS research for the Dakotas and Alaska. Obviously these organizational changes affect the management of research, but ARS scientists at the laboratory level continue to work on the same types of research they undertook before reorganization. Thus, those scientists who were part of

¹Retired June 1972; present address Winter Park, Florida.

the Insects Affecting Man and Animals Research Branch continue their research under the direction of Area and Regional Headquarters.

For those scientists who belonged to the Insects Affecting Man and Animals Research Branch and the many other scientists who made or contributed to accomplishments in the field of medical and veterinary entomology, we have assembled a brief chronological history of important entomological events that occurred shortly before and during the period when Federal scientists working in these fields were part of a more or less formal organization. Of course, not all the developments listed were the exclusive discoveries of scientists of the Insects Affecting Man and Animals Research Branch, but Branch scientists played an important role, either directly or in cooperation with other scientists, in many of the events listed. Indeed, close cooperation and friendly competi-

tion among Federal and State agencies has been the order of the century.

When you look over our compendium, you will agree that the Branch was in existence during a dynamic period in medical and veterinary entomology. Moreover, ARS can be justly proud of the many contributions made by its entomologists and other scientists. These investigators have left an enviable record, and the authors feel that under the new system the research effort in this important field will be continued and even intensified. There are still many perplexing problems that need to be solved, and they will require all of our ingenuity, dedication, and cooperative effort. In the new ARS, there are mechanisms for faster decision-making at the local level to meet local problems. In addition, thanks to the National Program Staff at Beltsville, there is increased coordination at the national level between the different disciplines.

List of Events—Medical and Veterinary Entomology

1855-58	Pyrethrum first used in the United States. (Before creation of USDA in 1862.)	1896	First recommendation to public for control of insects, ticks, and mites affecting livestock.
1862-66	During the Civil War, there were 1,585,196 cases of diarrhea and dysentery resulting in 37,794 deaths.	1897	Horn fly had spread over entire U. S., east of Rocky Mountains, to California, and Hawaii.
1881	Wire window and door screening first began to be used in U. S.		Oil of citronella used as an insect repellent.
1887	Horn fly first noted in United States, near Philadelphia.	1898	House fly proved to be carrier of typhoid fever. Transmission of malaria by <i>Anopheles</i> mosquitoes proved (Italy).
1892	L. O. Howard obtained first practical use of kerosene as mosquito larvicide. Role of cattle tick in transmission of Texas cattle fever discovered (Smith and Kilbourne).	1900	Plague discovered in U. S. (San Francisco). Mosquito-yellow fever relationship proved.

- 1901 "Swat the Fly" campaign began.
- 1898-1902 During the Spanish-American War, 185,056 cases and 1,500 deaths from diarrhea and dysentery. Disease caused 80% of all war deaths; as many as 600 malaria cases per 1,000 men.
- 1902 Mosquitoes discovered to be vectors of dengue.
- 1906 Ticks proved to be vectors of Rocky Mountain spotted fever. Arsenic dips developed for tick control on livestock; fever tick eradication program began; quarantine covered about 750,000 square miles.
- 1909 Typhus shown to be transmitted by human body lice.
Tularemia discovered in California.
First record we can find of Insects Affecting Man and Animals research. Title: "Investigations of Insects in Their Direct Relation to the Health of Man and Domestic Animals." This was the work of W. D. Hunter and F. C. Bishopp (under the direction of L. O. Howard, Chief of Bureau of Entomology) on cattle fever ticks and other ticks.
- 1910 First trip to northern Mexico to survey for ticks that might cross the border.
- 1911 Boll weevil driving Negro tenant labor away; substitute white farm labor suffering from malaria in the South.
- 1912 W. D. Hunter supervised tick work; he apparently became the first Chief, Insects Affecting Man and Animals, at this time.
First field station set up for screwworm control at Uvalde, Texas.
- 1913 Man and Animals research became part of Southern Field Crop Insect Investigations with W. D. Hunter as Chief of the new investigations.
- 1914 Borax found useful for fly control in manure.
Screwworm research began: "*Paralucilia macellaria* is not the only species concerned."
Hypoderma bovis found in Canada; surveys begun in the U.S. for *bovis*.
Pyrethrum-kerosene sprays began to be produced commercially for control of household pests.
Malaria control by fluctuating water levels first observed.
- 1915 Research on insects affecting man reported separately by Chief of Bureau for first time; same would apply to insects affecting animals; all work still under W. D. Hunter, Southern Field Crops Investigations.
- 1916 Carbolineum first used for control of poultry parasites.
Sodium fluoride discovered effective for poultry lice control.

- Argentine ant bait developed.
- USDA fly trap designed and recommended.
- 1918 Man and Animals research combined again; still under Hunter in Southern Field Crops Investigations.
- Human body louse research began (in cooperation with National Research Council and War Department).
- 1919 Airplane first used for surveying mosquito-breeding areas.
- During World War I, 79,537 cases of diarrhea and dysentery among troops causing 267 deaths; as many as 15 malaria cases per 1000 men.
- 1920 Screwworm annual loss estimated at \$4,000,000.
- 1921 Paris Green first noted as mosquito larvicide; revolutionized malaria control.
- 1922 Rotenone reported effective against cattle grub and cattle lice.
- 1923 Benzol and pine tar first recommended for screwworm control.
- 1924 Airplane first used in insecticide application for disease-vector insects—Paris Green for mosquito larvae, Louisiana.
- 1926 Insects Affecting Man and Animals Investigations apparently first established;
- W. V. King headed up Man research; F. C. Bishopp Animals research.
- Value of pyrethrum sprays shown in control of flies in dairies.
- 1927 F. C. Bishopp in charge, Insects Affecting Man and Animals, but stationed in Dallas, Texas.
- 1928 F. C. Bishopp moved to Washington, D. C., in charge, M&A; remained Chief of Branch (or Division) of Insects Affecting Man and Animals until November 9, 1941.
- New Jersey mosquito light trap and Clear Lake gnat trap invented.
- 1929 Sulfur dips developed for control of lice on sheep and goats.
- 1930 Rocky Mountain spotted fever found in Eastern U. S.
- 1931 Blow fly maggots first recommended for treatment of osteomyelitis.
- First recommendations (whose?) yellow electric lights as nonattractive to night-flying insects.
- 1933 "Screw-worm" discovered to be two species, *hominivorax* and *macellaria*.
- Ditching found effective in controlling salt-marsh mosquitoes and sand flies.
- Transmission of encephalitis by mosquitoes proved.

- 1935 Phenothiazine first tested as insecticide; used in horn fly control.
- DeMeillon (South Africa) showed pyrethrum sprays in homes lowered malaria spleen rate.
- Urea and allantoin, excreted by maggots, found to promote healing of wounds; can we call this first antibiotic work?
- 1937 E. F. Knipling proposed eradication of screwworm through sterile males.
- 1939 Diphenylamine found effective in wounds against screwworms.
- 1941 Development of aerosol bomb for mosquito control.
- EQ-62 screwworm remedy developed.
- E. C. Cushing became Chief, Man and Animals on retirement of F. C. Bishopp; Cushing was Chief until June 10, 1942, when he was called to active military duty, and again from November 2, 1945, until retirement on September 14, 1946.
- 1942 W. E. Dove became Chief, Man and Animals; Chief until October 31, 1945.
- Insecticide and repellent testing for Armed Forces began at Orlando, Florida; Dimethyl phthalate, benzyl benzoate, other repellents discovered or developed.
- 1943 DDT developed for control of insect vectors of typhus, malaria, other vector-borne diseases; shown practical for control of house flies, bed bugs, and fleas for civilian and military uses.
- DDT sprays and dusts developed for control of horn flies and lice on cattle and for control of lice on other livestock.
- 1945 Chigger area control shown with BHC, chlordane, or toxaphene.
- During World War II, 525,004 cases of diarrhea and dysentery, with 130 deaths; as many as 160 cases of overseas malaria per 1,000 men in 1943.
- 1946 Area control of ticks demonstrated with chlordane, DDT, and toxaphene.
- E. F. Knipling became Chief, Man and Animals; remained Chief until July 1, 1953, when succeeded by A. W. Lindquist.
- 1947 DDT resistance in house flies discovered.
- 1948 Methoxychlor proved effective for control of lice, flies on cattle.
- 1949 Mosquitoes in some localities found to be DDT-resistant; lindane recommended as substitute.
- 1951 EQ-335 smear developed for screwworm control.
- First automatic sprayer developed for fly control on livestock.

	Insecticides found effective against imported fire ant.	1962	W. C. McDuffie became Branch Chief; held position until December 30, 1966.
	First lice colony resistant to DDT established in Orlando, Florida, from lice collected in Korea.		Effective international collaboration program developed with World Health Organization for testing insecticides; as many as 1400 compounds tested in next 10 years.
	M-1960 clothing repellent developed and used in Korea.		
1953	Sugar baits proved effective in fly control.	1963	Mirex proved highly effective, selective material for the control of the imported fire ant.
	The most effective insect repellent (deet) developed.		
	A. W. Lindquist became Branch Chief; held the office until retirement May 31, 1962.	1966	First large-scale use of ULV aerial technique to control mosquito vectors of St. Louis encephalitis in Dallas, Texas, by U. S. Public Health Service.
1954	Screwworms eradicated from Curaçao, Dutch West Indies.	1967	C. H. Schmidt became Branch Chief July 2, 1967.
1955	First effective, safe cattle grub systemic found (ronnel, Corvallis, Oregon).		Synthetic attractant found for yellow jackets.
1957	Second effective, safe cattle grub systemic found (coumaphos, Kerrville, Texas).	1968	Ground ULV shown superior to high volume thermal aerosols for mosquito control. (Gainesville, Florida.)
	Colony of lindane-resistant lice from West Africa established at Orlando, Florida.	1969	Experiment at Sea Horse Key, Florida, demonstrated that mosquitoes can be controlled by the sterile male technique.
1958	First recommendations for cattle grub control by systemics. Initiation of a chemosterilant screening program for both male and female sterilants.		First report on use of sterile male technique for the control of tsetse fly on an isolated island.
	Screwworms eradicated from Southeastern United States by the sterile male method.	1970	Use of systemic insecticides to control rodent fleas demonstrated.

1971

Venezuelan equine encephalitis epidemic in Texas conquered by ultra-low volume aerial application of insecticides and massive horse vaccination program.

Development of repellent-treated netting for bed nets, head nets, and jackets. (Gainesville, Florida.)

Evidence of house fly pheromone found, and sex pheromone in female house flies identified.

1972

First demonstration of field effectiveness of juvenile hormone for control of the horn fly. (College Station, Texas.)

Regionalization of ARS on July 1, 1972, terminated the existence of the Insects Affecting Man and Animals Research Branch and the Entomology Research Division.